

REMARKS

Applicants have amended claims 1, 3-5 and 7-10, have cancelled claim 12, and have added new claim 25. Care has been taken to avoid the introduction of new matter. Claims 1, 3-11, 13-17 and 25 are presently pending in the application.

Regarding the Office Action's objection to claims 3-5, 7-9 and 10 and the Office Action's suggestions that the "glass layer" in claim 3 be amended to recite a "phosphosilicate glass layer" and that occurrences of "a glass layer" be changed to "the glass layer," Applicants have followed these suggestions by incorporating the suggested language into the objected-to claims. Accordingly, it is requested that the objection to the claims be reconsidered and withdrawn.

Regarding the Office Action's rejection of claims 1 and 3-17 under 35 U.S.C. 103(a) as allegedly being unpatentable over Frankel (U.S. Patent No. 5,968,587), Applicants respectfully disagree with this rejection. However, in an effort to expedite the prosecution of the present application, Applicants have amended each of the independent claims and submit the following.

Paragraph 0004 of Applicants' patent application specification state that a phosphosilicate glass (PSG) passivation layer is formed over a substrate to protect the underlying layers from damage caused by environmental factors, such as ambient moisture. According to Paragraphs 0005 and 0044 and Figure 2 of Applicants' specification, phosphosilicate glass passivation layers can possess inherent deficiencies which can be present after annealing of the phosphosilicate glass layer, wherein phosphorus atoms may tend to migrate toward the outer or upper surface of a phosphosilicate glass layer at which time the migrating phosphorus atoms may react with ambient moisture. As indicated in Figure 3 of Applicants' specification, typically, after a period of days, ambient moisture (designated by H₂O) reacts (as indicated by the diagonal arrows) with the phosphorus atoms that have migrated to the surface of the glass layer. This reaction tends to form undesirable defects in the glass layer which can mitigate the glass layer's utility as a passivation layer and which may lead to failure of the semiconductor device.

As set forth, for example, in paragraphs 0043 to 0047 of Applicants' specification, the present cap oxide layer, when formed and used in accordance with the present invention as described and claimed in the present application, substantially mitigates the formation of such defects. More particularly, the cap oxide layer substantially mitigates contact of ambient moisture with the migrated phosphorus atoms, so that reactions between the ambient moisture and migrated phosphorus atoms, and consequent formation of defects in the glass layer, are substantially mitigated.

Frankel does not appear to disclose or suggest, among other things, one or more of forming a cap oxide layer (the Frankel reference appears to form a cap glass layer); forming a cap oxide layer upon a glass layer with the cap oxide layer being formed to a thickness of at least about 300 Angstroms (the Frankel reference appears to form a cap glass layer to a thickness of 100-200 Angstroms); forming a cap oxide layer having a phosphorus blocking capability of at least 11 % by weight (see other differences set forth herein for support); forming a cap oxide layer upon a glass layer to mitigate defect formation in the glass layer for at least about a day (the Frankel reference appears to leave a cap glass layer on for a substantially smaller time duration); leaving an oxide cap over a phosphosilicate glass layer for a period of time of at least about a day (see preceding statement); leaving an oxide cap over a phosphosilicate glass layer for a period of time of at least about three days (see preceding statements); and forming a cap oxide layer to protect an underlying glass layer from defect formation by shielding the glass layer from moisture which is present in an immediate vicinity of the cap oxide layer and which would result in the formation of defects if allowed to contact the glass layer (the Frankel reference does not appear to place the substrate in a position where the glass layer would be vulnerable to formation of defects).

The Office Action stated in the context of claim 11, which is directed to a cap oxide layer thickness greater than about 300 Angstroms, that Applicants' claimed cap oxide layer thickness "does not define patentable [sic] over Frankel since the thickness is well known ... and the discovery of the optimum or workable range involves only routine skill in the art." Applicants

respectfully submit, however, that the Examiner is using hindsight, since the currently claimed thickness is not for just any cap oxide layer but rather for a (a) uniquely configured and arranged cap oxide layer that (b) is used in a unique way and environment (c) to address a unique problem that is/are not recognized or addressed in the Frankel reference.

The Office Action stated in the context of claim 12, which was directed to a cap oxide layer having a phosphorous blocking capability of at least 11% by weight, that Frankel teaches a phosphorous blocking capability of the cap oxide layer between about 2-8 wt % phosphorous. First, it should be understood that a blocking capacity of 11% or more, as claimed, does not equate to a blocking capacity of 2-8%. Secondly, even, assuming, arguendo, that Frankel were hypothetically to disclose a blocking capacity of 2-8%, which it apparently does not, there would still be no suggestion, absent hindsight, to modify that phosphorous blocking capacity to Applicants' claimed range. Applicants respectfully submit that the presently claimed phosphorous blocking capability is not for just any cap oxide layer but, rather, for a (a) uniquely configured and arranged cap oxide layer that (b) is used in a unique way and in a unique context (c) to address a unique problem that is/are not recognized or addressed in the Frankel reference. Moreover, with regard to Frankel, this reference discloses a "wt % of phosphorus in the resulting PSG film rang[ing] between about 2-8 wt %." In this context, Applicants respectfully submit that the Examiner has not established that a "wt %" is the same as a phosphorous blocking capability.

Accordingly, it does not appear that any of the rejected claims would have been obvious to one of ordinary skill in the art at the time of the invention in view of Frankel. Applicants thus respectfully request that the Examiner reconsider and withdraw the rejection based upon 35 U.S.C. § 103(a).

In view of the above, Applicants submit that the application is now in condition for allowance, and an early indication of same is requested. The Examiner is invited to contact the undersigned with any questions

Respectfully submitted,



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